CHAPTER 14

AIR HANDLING SYSTEMS

14-1. Minimum maintenance activities for air handling systems

The tables located at the end of this chapter indicate items which must be performed to maintain systems and equipment at a minimum level of operational readiness. The listed action items should be supplemented by manufacturer-recommended maintenance activities and procedures for specific pieces of equipment. Maintenance actions included in this chapter are for various modes of operation, subsystems, or components. Table 14-1 provides maintenance information for air handling units. Table 14-2 provides maintenance information for package air conditioning (DX) units. Table 14-3 provides maintenance information for air handling system instrumentation and electrical.

14-2. General maintenance procedures for air handling systems

This section presents general instructions for maintaining a typical air handling system.

a. Inspect air handling systems. Inspect for the following.

(1) Obstructions to air paths

(2) Obstructions to the face area of coils

(3) Dirty strainers (high pressure drop)

(4) Damage to or deterioration of equipment housings, fan housings, ducts, expansion joints, etc., that would let air leak from the system.

(5) Damage to, or deterioration of, ducts, flexible connections, and other components that would allow air to leak into occupied spaces.

(6) Obstructions in dampers, isolation valves, and device operators that would prevent free movement of the device.

(7) Deformed flexible piping connections and expansion joints

(8) Misaligned or sagging pipe and duct sections

(9) Deformed or broken pipe and duct support devices. (Verify that support devices designed to accommodate movement of the duct are free to operate.)

(10) Unusual noise, vibration, or overheating

(11) Loose mechanical or electrical connections

(12) Missing components

(13) Misalignment of drives, worn belts and pulleys, and loose drive belts on belt-driven equipment

(14) Damaged or missing equipment guards

(15) Damaged or missing insulation

(16) Damaged or missing equipment tags

b. Exercise remote-operated dampers and valves. Exercise all remote-operated dampers and valves.

(1) Verify free operation of dampers and valves.

(2) Inspect any packing glands, and tighten as necessary.

(3) Check for leaking seals.

(4) Wipe damper and valve operators clean, apply a light coat of protective oil to exposed operating shafts, and lubricate bearings and pinned connections.

(5) Adjust operator linkages for proper valve positioning, and adjust limit switches for proper position indication.

c. Test alarms. Verify operation of system alarms and alarm system by actuating appropriate system test push buttons. Verify that the audible alarm sounds and that all warning and annunciator lights operate.

d. Rotating equipment clearance adjustment. After long service, the running clearances in some types of rotating equipment (fans, pumps, compressors, etc.) may increase to the point where the device is losing capacity or pressure. Resetting the clearances will normally improve performance. Check clearances during annual inspections and adjust as required. Refer to the manufacturer's technical service manual.

e. Examine internal parts of rotating equipment. Periodically (at least annually) remove casing access covers and inspect components for wear. Replacing a relatively inexpensive part after only moderate wear can eliminate the need to replace more expensive parts at a later date. Refer to manufacturer's technical service manual.

f. Clean all equipment. Clean all equipment regularly. Clean equipment is easier to inspect, lubricate, and adjust. Clean equipment also runs cooler and looks better.

Table 14-1. Air handling unit

Air Handling Unit	
Action	***Frequency***
WARNING! BEFORE BEGINNING ANY MAINTENANCE. DISCONNECT ELECTRICAL POWER TO THE AIR HANDLING UNIT. LOCK OUT AND TAG SWITCH AT MCC.	
Enclosure and Access Doors	
Inspect the enclosing cabinet, isolators, and supporting structures. Tighten loose bolts and fasteners. Ensure that access door gaskets are effective; if not, replace.	mo
Filters	
Check filters. Replace as required.	mo
Coils	
Inspect for leads and corrosion. Repair or replace as required. Check for dirty coils. Clean as required; wash or blow clean with inert gas or compressed air.	mo
Drain Pan	
Clean condensate drain pan, drain connection, and piping. Brush or blow drain lines clean.	mo
Fans	
Check for hot bearings.	week
Check for unusual noise or vibration.	week
Check tightness of fasteners (nuts, machine screws, set screws, shaft collars, etc.) and tighten as required.	mo
Visually inspect drive alignment.	mo
Lubricate bearings:	
Sleeve bearings.	mo
Ball bearings.	3 mos
Roller bearings.	mo
For units with belt drives inspect belts and pulleys.	mo
Measure belt tension and alignment; adjust as required.	mo
Inspect fan blades (or fan wheel) for buildup of dirt or scale, use soft brush or clean rags to loosen or remove dirt, and flush surfaces with clean water.	mo

Table 14-1. Air handling unit (continued)

Air Handling Unit	
Action	***Frequency***
CAUTION! SOME FANS MAY HAVE INTERNAL COMPONENTS PROTECTED WITH CORROSION-RESISTANT COATINGS WHICH CAN BE EASILY DAMAGED. DO NOT USE CLEANING TOOLS OR MATERIALS THAT WILL DAMAGE COATINGS.	
Inspect components and repair or replace as required. This includes repairing defects in protective coatings. If work performed on fan wheel, check balance and rebalance as required.	yr
Dampers	
Inspect damper assemblies, and report all discrepancies to supervisor. Inspection shall include:	
Verify damper position relative to facility mode of operation. Adjust position indication switches as required.	week
Exercise dampers to verify free operation; repair or adjust as required.	mo
Inspect seals and seal contacting surfaces for full contact; adjust seals and/or repair seals and seal contacting surfaces as required.	mo
Wipe clean damper operator and connecting linkages; apply a light coat of oil.	mo
Clean and inspect bearings; lubricate and adjust bearings as required.	mo
Operated Valves	
Verify valve position relative to facility mode of operation. Adjust position indication switches as required.	week
Clean rods on valve operator and apply a light coat of protective oil.	mo
Inspect seals.	mo
Inspect and tighten packing as required.	mo
All Valves	
Exercise all valves and perform routine maintenance, and report all discrepancies to supervisors.	
Grease stems on OS&Y valves.	mo
Inspect packing gland and tighten as necessary.	mo
Verify correct position and operation.	mo
Check for leaking seals.	mo

Table 14-2. Package air conditioning (DX) unit

Package Air Conditioning (DX) Unit	
Action	***Frequency***
WARNING! BEFORE BEGINNING ANY MAINTENANCE, DISCONNECT ELECTRICAL POWER TO THE UNIT. LOCK OUT AND TAG SWITCH AT MCC.	
Enclosure	
Inspect the enclosing cabinet, isolators, and supporting structures. Tighten loose bolts, fasteners, and anchors.	4 mos
Filters	
Check filters. Replace as required.	mo
Coils and Piping	
Inspect refrigeration circuit for oil and refrigerant leaks with halide torch or electronic leak detector. Correct deficiencies. Check refrigerant charge and lubricating oil levels. Recharge and add oil as required.	4 mos
Drain Pan	
Clean condensate drain pan, drain connection, and piping. Brush or blow drain lines clean.	4 mos
Fans	
Check for hot bearings.	4 mos
Check for unusual noise or vibration.	4 mos
Check for tightness of fasteners (nuts, machine screws, set screws, shaft collars, etc.) and tighten as required.	4 mos
Lubricate bearings:	
Sleeve bearings.	mo
Ball bearings.	3 mos
Roller bearings.	mo
For units with belt drives, inspect belts and pulleys.	4 mos
Measure belt tension and alignment; adjust as required.	4 mos
Inspect fan blades (or fan wheel) for buildup of dirt or scale, use soft brush or clean rags to loosen or remove dirt, and flush surfaces with clean water.	4 mos

Table 14-2. Package air conditioning (DX) unit (continued)

Package Air Conditioning (DX) Unit	
Action	***Frequency***
CAUTION! SOME FANS MAY HAVE INTERNAL COMPONENTS PROTECTED WITH CORROSION RESISTANT COATINGS WHICH CAN BE EASILY DAMAGED. DO NOT USE CLEANING TOOLS OR MATERIALS THAT WILL DAMAGE COATINGS.	
Inspect internal components and repair or replace as required. This includes repairing defects in protective coatings. If work performed on fan wheel, check balance and rebalance as required.	yr
Dampers	
Inspect damper assemblies, and report all discrepancies to supervisor. Inspection shall include:	
Verify damper position relative to facility mode of operation. Adjust position indication switches as required.	4 mos
Exercise dampers to verify free operation; repair or adjust as required.	4 mos
Inspect seals and seal contacting surfaces for full contact; adjust seals and/or repair seals and seal contacting surfaces as required.	4 mos
Wipe clean damper operator and connecting linkages; apply a light coat of oil.	4 mos
Clean and inspect bearings; lubricate and adjust bearings as required.	4 mos
Compressor and Condenser Fan	
Observe and record the following:	
Compressor head pressure.	4 mos
Compressor suction pressure.	4 mos
Compressor oil pressure.	4 mos
Compressor temperature.	4 mos
Compressor motor amperage.	4 mos
Compressor motor voltage.	4 mos
Fan motor amperage.	4 mos
Fan motor voltage.	4 mos
Controls	
Clean and inspect all control devices, safety devices, thermostats, and similar devices. Calibrate and adjust all devices as required.	4 mos

Table 14-2. Package air conditioning (DX) unit (continued)

Package Air Conditioning (DX) Unit	
Action	***Frequency***
Pumps	
Inspect equipment and perform routine maintenance, and report all discrepancies to supervisor.	
Check for hot bearings.	week
Check for unusual noise or vibration.	week
Check tightness of fasteners (nuts, machine screws, set screws, shaft collars, etc.) and tighten as required.	mo
Visually inspect drive alignment.	mo
Lubricate bearings:	
Sleeve bearings.	mo
Ball bearings.	3 mos
Roller bearings.	mo
For units with belt drives, inspect belts and pulleys.	4 mos
Measure belt tension and adjust as required.	4 mos
Check packing and adjust as required.	mo
Inspect internal components, replace as required, and adjust in accordance with manufacturer's recommendations.	yr

Table 14-3. Air handling system instrumentation and electrical

Air Handling System Instrumentation & Electrical	
Action	***Frequency***
Transmitters and Controllers	
Calibrate and adjust in accordance with the manufacturer's recommendations.	mo
Thermometers	
Check for accuracy. Remove thermometers from their wells and check against calibrated thermometer in controlled temperature bath.	yr
Pressure Gauges	
Isolate pressure gauge by closing the proper valves. Remove and check in a fixture against a calibrated gauge. Adjust as required following equipment manufacturer's instructions.	yr
Motors	
Check and clean cooling airflow passages on electric motors as necessary so that nothing obstructs airflow.	6 mos
All Electrical Devices	
Check, clean, and tighten terminals at motors, starters, disconnect switches, etc.	6 mos
Wiring	
Check insulation on conductors in starters, switches, and junction boxes at motors for cracks, cuts, or abrasions. Replace wiring as required and correct cause of damage.	6 mos